

Remarks/Arguments

1. **Elections/Restrictions:** Examiner raised a restriction requirement against claims 51 – 59, asserting that these claims are drawn "to a non-elected specie of figure 6 to right circular cone while prosecution has thus far been to the specie of figure 5." Applicant objects to Examiner's assertion that claims 51 – 59 are not drawn to the specie that has been the subject of prosecution thus far. The structure shown in FIG. 4 is constructed of elements shown in FIG. 5, which shows, in fact, a right circular cone. Applicant respectfully requests that Examiner review FIG. 5 again. That element has a vertex and a cone wall, the cone wall is formed by a straight line that sweeps in a circle about a vertical axis that extends through said vertex. The cone wall thus comprises straight lines that extend from a base edge of the cone and that intersect each other at the vertex. This is the definition of a right circular cone.
2. FIG. 6 is also a right circular cone, but a truncated and narrow right circular cone. A structure was claimed in the originally filed claims that was formed of these truncated cones, which were arranged such that the truncated vertex pointed inward toward the center point of the sphere. Claims directed toward this structure have been cancelled.
3. Applicant submits that this restriction is in error and respectfully requests that Examiner withdraw the restriction and examine these claims.
4. Applicant makes an election with traverse and, in order to comply with the restriction requirement, withdraws claims 51 – 59.
5. **Amendments to the Claims:** Claims 32, 33, and 35 were amended to clarify that the strut distances recited in claim 35 are the same strut distances defined in claim 32. Language was added to claim 51, to clarify the maximum / minimum limits. This

added language was taken from claim 32. These amendments introduce no new subject matter and Applicant requests approval and entry of the amended claims.

6. **35 U.S.C. § 103(a) Rejections:** Examiner has rejected claims 32 – 33, 35 – 36, 42, 43, 46, 47, and 60 as being unpatentable over Chamberlain (4,270,320) in view of Hein (3,359,694). Examiner asserts that Chamberlain discloses a curving element, each element having a base, a wall, and a vertex. The Chamberlain elements are spherical elements. Every point on the surface of a Chamberlain element is equidistant from a common fixed point of the sphere that has the radius of curvature of the element. A "vertex" is: "4. Geometry. a. The point at which the sides of an angle intersect. b. The point on a triangle opposite to and farthest away from its base. c. A point on a polyhedron common to three or more sides. d. The fixed point that is one of the three generating characteristics of a conic section." See Exhibit "A", attached, which includes excerpts from the American Heritage Dictionary of the English Language. The Chamberlain element has no point at which angles intersect, has no triangle, thus no point on a triangle farthest from the base, does not contain a polyhedron with three or more sides, and thus, has no point common to the sides, and it is not one of the three generating characteristics of a conic section (vertex, directrix, and generator). Neither the Chamberlain element nor the Chamberlain structure contains a vertex.

7. Examiner further asserts that Chamberlain discloses a "circular cone." Throughout prosecution of the present application, Examiner has repeatedly referred to the partial spherical element of Chamberlain as a "cone". Applicant objects to Examiner's stretching of the meaning of the word "cone." Claims 32, 51, and 60 are very explicit in their definitions of the cone element. Chamberlain does not disclose an element that is a circular cone. Chamberlain discloses a spherical structure, each

element being a partial spherical element, that is, a multi-directionally curved element, wherein each point on the surface of the element is equidistant from a common fixed point, which is the center point of a sphere. Exhibit "A" provides the definition of a cone. "1.a. A surface generated by a straight line, the *generator*, passing thorough a fixed point, the *vertex*, and moving along the intersection with a fixed curve, the *directrix*. b. The surface generated by such a generator passing through a vertex lying on the perpendicular axis of a circular directrix. Also called "right circular cone." 2.a. The figure formed by such a surface bound, or regarded as bound, but its vertex and a plane section taken anywhere above or below the vertex. ..." There is no vertex in the Chamberlain partial spherical element, there is no wall formed by a generator sweeping about a directrix. The Chamberlain element is not a cone; the Chamberlain structure is not a cone.

8. Examiner further asserts that the arrangement of the Chamberlain elements forms a "first strut distance," a "second strut distance," ... etc. The strut distances are formed by straight lines of the cone wall. The Chamberlain elements, being continuously curved elements, do not contain or disclose a single straight line thus, Chamberlain cannot disclose or teach the strut distances as claimed. Examiner also asserts that Chamberlain discloses the strut distances and directions between vertexes, as claimed in claim 35 of the present application. The plurality of elements in Chamberlain form a spherical structure. Every point on the surface of the structure is equidistant from the fixed common point of the sphere. There is no vertex on the entire structure and there is no plurality of vertexes, and, thus, there can be no strut distances that extend between vertexes.

9. Examiner then admits that Chamberlain does not disclose the use of conical elements. This supports Applicant's arguments, that the Chamberlain structure does not have a vertex or a plurality of vertexes. Examiner relies on Hein for a disclosure of a conical element, saying that "Hein (figure 1) discloses conical elements (I, H. and ABCGE) connected to each other to form a domical structure." and that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Chamberlain's structure to show the elements being conical elements as taught by Hein. Applicant refers to Exhibit "A" and the definition of "cone," provided above. Hein does not disclose a conical element as claimed in claims 32, 51, and 60.

10. Hein describes using six different types of elements, A, B, C, D-E, F-G, and H-I, to construct the geodesic structure. E is a mirror-reverse construction of D and I a mirror-reverse construction of H. All of the elements are flat triangles and each type of triangle, A, B, C, D-E, F-G, or H-I, differs from all the other types in size, shape, or angle. Hein, col. 2, lines 51 – 61. (Note: the "E-I" in Hein, col. 2, is an obvious typing error and should read "H-I".) The triangles are placed in specific arrangements and orientations to fit precisely next to each other, in order to form the polyhedrons that create the structure. No straight line of a "cone wall" of a Hein triangle extends *"substantially parallel to at least one straight line of said adjacent conical element so as to form together a straight strut between said vertex of said first conical element and said vertex of said adjacent conical element ... "* (Fischbeck, Claim 32). For example, looking at lines identified as "24" and "28" in FIG. 1 of Hein, we see that these two lines extend from a vertex, but they are not parallel to one another because they are at an angle to each other and intersect each other at the vertex, nor do they form a straight strut between the vertexes of adjacent conical elements. Lines 24 and 26 are also not parallel to each other (the base line 24B is wider than the top line 26T), nor do they form

a straight strut between the vertexes of adjacent conical elements. And so on. No two lines of adjacent conical elements are parallel to each other and form a straight strut between the vertexes of the two adjacent conical elements. None of the polyhedrons overlap with adjacent polyhedrons, so as to form a straight strut between the vertexes of two adjacent conical elements. If one polyhedron were to overlap with a first adjacent polyhedron, a mismatch and a gap would invariably occur with a second adjacent polyhedron. Furthermore, the triangles must fit next to each other precisely and do not allow for any amount of displacement to provide an adjustability of the conical elements that is infinitely variable between a minimum and a maximum limit, as claimed in claim 32. This is evidenced by the fact that different sizes and shapes of the triangles are required and they must be assembled in a precise order. See Hein, col. 2, line 65 – col. 3, line 25, which describes how the angles of the triangles are calculated, based on some starting values. The Hein triangles must be fitted onto an underlying structure, examples of which are shown in Hein FIGS. 9 – 16. The underlying structure does not allow for any displacement of the elements or any adjustability.

11. The combination of Chamberlain and Hein does not render any of the claims of the present application unpatentable. The combination of these disclosures has to teach or motivate one of ordinary skill in the art to come up with the structure of the current application, i.e., has to teach, suggest, or motivate one to construct a structure comprising the conical elements that are claimed in claims 32, 51, or 60. Chamberlain discloses an arrangement of partial spherical elements that form a hemispherical structure and Hein an arrangement of planar triangles that form a geodesic dome. Neither of these structures is a structure comprising a plurality of conical elements as claimed in the present application.

12. Particularly with regard to claim 60, which recites a conical element that is a single element, Applicant asserts that neither Hein or Chamberlain disclose a structure comprising conical elements, as claimed, nor a conical element that is a single element.

13. The combination of Chamberlain and Hein teaches away from the use of conical elements to construct a geodesic structure, because a person of skill in the art, looking at the continuously curved partial spherical elements of Chamberlain on the one hand, and at the flat triangles of Hein on the other hand, would not be motivated to replace them with a conical element as claimed. The shape of the cone element allows the elements to be placed in an overlapping arrangement that forms a straight strut between vertexes, without having to align the elements precisely relative to each other. Several distinct advantages of the dome structure claimed in the present application result from the use of the cone element: (1) the structure can be formed by arranging a plurality of identical cone elements in an overlapping confirmation with a (2) great degree of freedom of variability, and (3) the cone element itself is easily formed from a flat sheet material. None of the elements disclosed in the prior art allows one to construct a structure with the ease and simplicity of the Fischbeck structure. Chamberlain's elements do not have several of the features of the claimed cone elements, (i.e., no vertex, no straight strut formation between vertexes, no straight cone walls) and they must be carefully formed as partial spherical elements. Hein and all other prior art relating to geodesic domes rely on the use of flat triangles that are carefully dimensioned and arranged in a strict and precise pattern on a grid structure. There is no variability, no overlapping arrangement, and, although the basic element is a flat triangle, the Hein and Fuller geodesic domes require triangles of numerous different shapes, sizes, and angles, that must be arranged very precisely within the grid structure. Furthermore, a person working with 3-dimensional compound curved

elements, such as the Chamberlain element, would not be able to and would not try to build a multi-angled structure, such as the Fischbeck dome, and a person working with the two-dimensional flat elements of Hein, in view of the known and pervasive technology of constructing geodesic domes with precisely configured flat panels and grid structure, would not think to use a three-dimensional cone to construct the multi-faceted geodesic-type dome.

14. Furthermore, the use of the cone elements, as claimed in the present application, lends results that are unexpected and unobvious and have a statistical and practical significance. The use of the cone elements results in a five-fold difference in volumetric capacity between the smallest possible and largest possible structures, comprising cone elements that are identical in size, shape, and number. The variability between structures depends on the strut distances. For example, assuming we are constructing Fischbeck structure S1 with 100 Cones X, "X" defining specific angle at the vertex and length of the cone wall, and the 100 Cones X are overlapped such that the strut length is at its minimum limit, i.e., a straight line of the cone wall of a first Cone X almost completely overlaps a straight line of the cone wall of a second Cone X. The resulting structure S1 has a diameter of 1D and a volume 1V. Using the very same 100 Cones A to construct a second Fischbeck structure S2, whereby the same straight line of the cone wall of the first Cone X overlaps minimally with the same straight line of the cone wall of the second Cone X, results in the structure S2 having a diameter 1.7D and a volume 5V. Diameter and volumetric capacity of the two structures, constructed of the very same 100 Cones A, are significantly different. None of the prior art structures has this capability. When the Chamberlain elements are overlapped to a maximum extent, the resulting structure reveals a smaller portion of the sphere that is defined by the radius of curvature of the elements; when overlapped minimally, the resulting structure

is a greater portion of the same sphere that is defined by the radius of curvature of the elements. In other words, the diameter of the Chamberlain structure will never change. With conventional geodesic structures constructed of triangular facets, such as those disclosed by Hein or others, it is not at all possible to vary the arrangement of the elements and, thus, not at all possible to vary the diameter or the volumetric capacity of the Hein structure. One can easily see that this variability is significant and has great practical application. The variability allows one to construct a structure that uses the allotted space to best advantage. It also allows one to use a thinner material for the cone elements, for one reason or another, but with greater overlap, to provide greater stability.

15. Applicant submits that the disclosures of Chamberlain and Hein, either alone or in combination, do not teach, suggest, or motivate one skilled in the art to use conical elements of the present invention to construct the geodesic structure as claimed in claims 32, 51, and 60 of the present application and requests that Examiner withdraw the rejections under 35 U.S.C. § 103(a) based on Chamberlain and Hein.

16. Claims 42, 43, 46, and 47 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Chamberlain in view of Hein and claims 44 and 45 as being unpatentable over Chamberlain in view of Hein and further in view of Fuller (3,203,144). The combination of these references does not disclose, teach, or motivate one skilled in the art to construct a structure with the elements claimed in claim 32. These rejected claims all depend from claim 32, which Applicant submits contains allowable subject matter, therefore, these claims also contain allowable subject matter. Applicant requests that Examiner withdraw these rejections and allow all claims currently presented.

17. **Previous Rejections:** Below is a table, listing the references relied upon in this and past office actions, to reject the claims of the present application. The purpose of this table is to illustrate to Examiner, just how many different types of elements he has cited, as either anticipating or rendering the claimed invention unpatentable, and to point out that none of them, alone or in combination, has disclosed the structure made of the conical elements claimed in this patent application. Examiner has cited references that disclosed spherical elements, polyhedral elements, polyhedral elements formed from flat triangular panels or from folded diamond-shaped elements, cone elements that point inward to the common fixed point of a sphere, and a multiconic structure. No reference nor a combination of references cited has motivated one to use a cone in the arrangement claimed in the independent claims of the present application to form the claimed structure. Some of the rejections have been redundant, in that they relied on elements that were structurally very similar. For example, Fuller, Tuitt, and Hein disclose some type of flat triangular panel arranged to form a polyhedron. At least two references disclosing circular cones pointing inward toward the common fixed point of the sphere have been cited.

18. The Fischbeck structure can be constructed of any number of identical cone elements greater than four and, thus, have any number of vertexes greater than four. None of the prior art teaches or discloses a structure that has this versatility, flexibility, or the simplicity of this structure. Conventional geodesic structures require precise dimensioning and arrangement of panels or struts in a specific geometric pattern that result in a predetermined number of vertexes. The Chamberlain structure has no vertexes. No combination of the prior art teaches or discloses a structure that has the versatility and simplicity of the Fischbeck structure.

Office Action	Reference	Description of Element	Comments
03/25/2003 12/15/2003	6,098,347 (Jaeger et al.)	Flat triangular sections arranged in pyramidal frame	Successfully traversed
03/25/2003 12/15/2003 09/08/2004 05/19/2005 11/17/2005 07/14/2006 11/30/2006 06/01/2007	4,270,320 (Chamberlain)	Continuously curved spherical elements arranged to form a spherical structure	traversed
05/19/2005 11/17/2005	3785066 (Tuiti)	Sheet of foldable paper, folded to form a four-sided polyhedron	successfully traversed
11/17/2005	2682235 (Fuller)	Flat triangular panels fitted into a frame	successfully traversed
02/02/2006	1009434 (Mohr)	Right circular cones pointing inward toward the common fixed point of the sphere	successfully traversed
02/02/2006	4794742 (Henderson)	Multiconic shell structure	successfully traversed
02/02/2006	3841039 (Farnsworth)	Frustoconical sections in walls of a polyhedral structure	successfully traversed
07/14/2006 11/30/2006	5340349 (Berg-Fernstrum)	Right circular cones pointing inward toward the common fixed point of the sphere	successfully traversed
07/14/2006 11/30/2006 06/01/2007	3203144 (Fuller)	Laminar diamond-shaped sheets, folded to form flat triangles. Sheets have an attachment edge.	successfully traversed successfully traversed traversed
06/01/2007	3359694 (Hein)	Polyhedral elements comprising flat triangular panels. Polyhedrons form a geodesic dome structure	traversed

19. Applicant respectfully requests that Examiner consider the extent of the patent prosecution and acknowledge with a Notice of Allowance that none of the prior art references discloses the invention of the present application.

20. **Conclusion:** Claims 32, 33, and 35 were amended; no new claims were added, no claims cancelled. Applicant submits that the restriction requirement placed on claims 51 – 59 is in error and requests that this restriction be withdrawn and claims 51 – 59 examined. Arguments were presented to overcome all of the 35 U.S.C. § 103(a) rejections raised.

21. This amendment is being filed within the shortened statutory period of the Office Action, thus no time extension fees are due.

22. Applicant believes the claims as currently presented are in condition for allowance. Should, however, issues be raised in this response that can easily be resolved in a direct communication, Applicant kindly requests that Examiner call or email the Undersigned.

Respectfully submitted,



Patricia M. Mathers

Attorney for Applicants

Reg. No. 44,906

Bohan, Mathers & Associates, LLC

P. O. Box 17707

Portland, ME 04112-8707

Tel: 207 773 3132; Fax: 207 773 4585

Email: pmm@bohanmathers.com

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Enclosed:
Exhibit "A"

EXHIBIT "A"

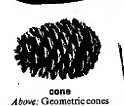
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2. *Obsolete*. To compare. —*intr.* To hold a conference.



Center: Shell of *Comes aulicus*, textile cone
Below: Cone of *Pinus taeda*, loblolly pine

